Nicholas Vadivelu

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Experience

Citadel · Quantitative Research Intern — *Jun 2021 – Aug 2021*

NVIDIA · Performance Software Engineering Intern — *Aug 2020 – Dec 2020*

- Reduced BERT/Megatron **inference latency by up to 30%** by enabling sparsity for **TensorRT** in **C++**
- Open-sourced sparse BERT in **Python**, democratizing the current fastest inference implementation

Uber ATG · Research Intern — *Jan 2020 – Aug 2020*

- Improved **object detection by 90%** (AP) and **motion forecasting by 22%** (L2) of a self-driving neural net under realistic positional error, significantly improving safety for future riders
- Wrote a **first author paper** on the learned positional error correction system (accepted at CoRL)

Google Brain · Research Software Engineering Intern — *May 2019 – Aug 2019*

- Unlocked K-FAC for **over 370,000 users** by implementing and open-sourcing automatic support for arbitrary neural network architectures and integrating it into the Keras ecosystem
- Enabled simple **multi-node, multi-GPU/TPU training** with efficient distributed operation placement
- Designed, created, and open-sourced idiomatic, reproducible training recipes for users

John Hancock Financial · Data Science Intern — *May 2018 – Aug 2018*

- Achieved a **fraud detection rate of 63%** through designing an unsupervised machine learning model
- Deployed 25 fraud identifying heuristics in **SQL** that **correctly flagged 100+** fraudulent claims

Sunnybrook Research Institute · Software Developer Intern — *Jul 2017 – Aug 2017*

- Improved MRI segmentation accuracy by **up to 80%** by via techniques like watershed and clustering
- Reduced time to contour MRI scans from **~5 hrs to ~40 mins** through automation software

Publications

Nicholas Vadivelu, Mengye Ren, James Tu, Jingkang Wang, Raquel Urtasun. Learning to Communicate and Correct Pose Errors. In *Conference on Robot Learning (CoRL)*, Virtual, 2020

Pranav Subramani, **Nicholas Vadivelu**, Gautam Kamath. Enabling Fast Differentially Private SGD via Just-in-Time Compilation and Vectorization. In *NeuRIPS PPML Workshop*, Virtual, 2020

Open Source

PyTorch Ignite: Improved metrics performance by **up to 63%** by designing and implementing **async updates for distributed metrics** with tests and documentation

Leadership

Data Science Club Lectures: Designed and presented workshops on neural networks, machine learning, data cleaning, data visualization, MLOps, clustering, and more for **600+ students**

WATonomous Design Team: Implemented real-time object detection in **Tensorflow** and **OpenCV**

Projects

Pokemon Analysis: Scraped, visualized, and analyzed data with Markov chains, boosting, and more

JAX ResNet: Open-sourced composable, unit-tested code and checkpoints for ResNet variants

Thrive Life Simulator: Created a **3D ray-casting engine** from scratch for a game in **Java**

ShapeCheck: Published a framework agnostic runtime array/tensor checking library with CI to **PyPI**

Education

University of Waterloo · Computer Science & Statistics (B. Math) — *2017 – 2022*

Research Assistant (Advisors: G. Kamath Fall 2020, P. Poupart Fall 2019, L. Tan Winter 2019)
Cumulative GPA: 3.94/4.00 - Dean's List